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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Srinath Hosur

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EXAMINER

AHN, SAM K

ART UNIT

PAPER NUMBER

2637

DATE MAILED: 11/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/679,487

Applicant(s)

HOSUR ET AL.

Examiner

Sam K. Ahn

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on amendment, received on 05/05/04.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14, 16-20, 22, 25, 26 and 28-36 is/are rejected.
- 7) ☒ Claim(s) 15, 21, 23, 24, 27 and 37 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see p.11-12, filed 05/05/04, with respect to the rejection(s) of claim(s) 1-12, 14, 16-21, 23-26, 28-34 and 36 under 102(e) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Sourour et al., USP 6,147,982 (Sourour) and Nystrom et al, USP 6,526,091 B1 (Nystrom), cited previously.

Claim Objections

2. Claims 1-37 are objected to because of the following informalities:

In claim 1, lines 2, 4 and 6 delete "the signal" and insert "the wireless communicated signal".

In claim 3, line 3, delete "a first" and insert "the first".

In claim 4, line 5, delete "integer M" and insert "integer number M".

In claim 19, line 2, delete "the signal" and insert "the wireless communicated signal".

In claim 21, line 2, delete "the signal" and insert "the wireless communicated signal".

In claim 23, line 7, delete "each additional" and insert "each of said additional".

In claim 28, lines 2, 4 and 6, delete "the signal" and insert "the wireless communicated signal".

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In claim 30, line 2, delete "the signal" and insert "the wireless communicated signal".

In claim 30, line 3, delete "a first" and insert "the first".

In claims 35 and 37, lines 3 and 2, respectively, delete "the signal" and insert "the wireless communicated signal".

In claim 37, line 5, delete "synchronization component" and insert "synchronization channel component".

Claims 2,5-18,20,22,24-27,29,31-34 and 36 directly or indirectly depend on claim 1 or 28. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-10,13,14,16-18,20,22,25,26,28-32,35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sourour et al., USP 6,147,982 (Sourour) in view of Nystrom et al, USP 6,526,091 B1 (Nystrom), cited previously.

Regarding claims 1 and 28, Sourour teaches a method and an apparatus of a wireless receiver (see Fig.2), comprising: circuitry (14) for receiving a wireless communicated signal (13), wherein the signal is a pseudo noise

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code (note col.1, lines 10-26 wherein the signal received comprises PN code which is synchronized with the locally generated PN code); circuitry (15) for correlating a synchronization channel value to the signal to produce a plurality of correlation samples (output of 15) in response to a correlation between the synchronization channel value (C_{i+n} , see Fig.4) and the signal; circuitry (16) for comparing the plurality of correlation sample to a threshold; circuitry (17) for storing as a first set of correlation samples (C_1 in Fig.6B) selected ones of the plurality of correlation samples that exceed the threshold (note col.4, line 57 – col.5, line 13) and are within a first time sample period (having a period of j , wherein j is incremented for each sample period of having $2N$ samples, note col.3, lines 57-67), wherein each of the correlation samples in the first set has a corresponding sample time (indexes, $R^j(i)$) relative to the first time sample period; and circuitry for combining (66 in Fig.6B, note col.5, lines 30-48) a second set of correlation samples with the first set of correlation samples. However, Sourour does not explicitly teach wherein the signal of pseudo noise code comprises a first synchronization channel component.

Nystrom teaches correlation of received signal wherein the signal transmitted in a synchronization channel (SCH) comprises the first synchronization channel component (PSC), which is spread by pseudo noise. (see Fig.3 and note col.5, lines 3-33) Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Sourour's system by transmitting and receiving the signal, wherein the

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signal transmitted in the SCH channel comprising the first synchronization channel component, for the purpose of improving synchronization between remote terminals and base station, as taught by Nystrom. (note col.3, lines 37-45)

Regarding claims 2 and 29, Sourour in view of Nystrom teach all subject matter claimed, as applied to claim 1 or 28. Sourour further discloses wherein the second set of correlation samples (C2 in 58 of Fig.6B) are within a second time sample period (having equivalent time sample period as the first time sample period of j); wherein each of the correlation samples in the second set has a corresponding sample time relative to the second time sample period (see Fig.6B wherein registers in C2 also has corresponding sample time or indexes); and wherein the circuitry for combining comprises circuitry for combining each sample in the second set of correlation samples with a relative sample in the first set of correlation samples such that each combined sample time relative to the first and second time sample periods (66 in Fig.6B and note col.5, lines 30-48).

Regarding claims 3 and 30, Sourour in view of Nystrom teach all subject matter claimed, as applied to claim 1 or 28. As explained previously, Sourour in view of Nystrom teach the signal transmitted and received in the synchronization channel, and Nystrom further teaches wherein the

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synchronization channel comprises a plurality of time slots (see Fig.3), and wherein each of the plurality of time slots comprises a first synchronization channel component (PSC). And although Sourour does not explicitly teach sample period of 14 (as taught by Sourour, note col.3, lines 57-67), to be consistent with the sample period of 10, one skilled in the art may be motivated to change the value of N to be 5, which would allow the two systems to have equivalent sample periods, for the purpose of properly transmitting signal at the synchronization channel. Thus, each of the first and second time sample period has a duration equal to each of the plurality of time slots.

Regarding claims 4-8, Sourour in view of Nystrom teach all subject matter claimed, as applied to claim 3. Sourour further teaches wherein the plurality of correlation samples consists of an integer number N correlation samples (2N), wherein the selected ones of the plurality of correlation samples that exceed the threshold consist of an integer number M selected ones of the plurality of correlation samples (stored in the History Registers of 58 in Fig.6B), and wherein integers H1 (see Fig.5, correlation values greater than n_2 and within Region Three), H2 (correlation values greater than n_1 and within Region Two) and M history set are selected depending on the available memory. (note col.4, lines 45 – col.5, line 13) Therefore, one skilled in the art would analyze that by setting values of the thresholds (n_1 , n_2) accordingly, different number of correlation samples

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will be stored, wherein M is inherently less than N as the system stores only correlation samples greater than the thresholds. However, Sourour does not disclose expressly wherein the threshold is at a level such that M is approximately one-half or one-tenth of N. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to set the thresholds (H1, H2 and M) such that the number of correlation samples stored are one-half or one-tenth of the received correlation samples. Applicant has not disclosed that storing one-half or one-tenth correlation samples provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, may have set the thresholds as such to result in storing only one-half or one-tenth of the correlation samples. Therefore, it would have been obvious to combine to one of ordinary skill in this art to modify Sourour's teaching by adjusting the levels of H1, H2 and M such that the correlation samples stored are one-half or one-tenth correlation samples for the purpose of reducing memory consumption (note col.4, lines 50-54) and obtain the invention as specified in claims 4-8.

Regarding claims 9 and 31, Sourour in view of Nystrom teach all subject matter claimed, as applied to claim 1 or 28. Sourour further discloses wherein the step of combining comprises forming a sum by adding the first and second set of correlation samples. (66 in Fig.6B, note col.5, lines 30-48)

Regarding claims 10 and 32, Sourour in view of Nystrom teach all subject matter claimed, as applied to claim 9 or 31. Although Sourour does not explicitly teach dividing the sum by two, Sourour further teaches that the sum of the first and second set of correlation samples are divided by $M+1$. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to divide the sum by two. Applicant has not disclosed that averaging two sample periods provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with dividing the samples by $M+1$ when more timing samples are averaged because it may provide a better estimate of the correlation values for synchronization. Therefore, it would have been obvious to one of ordinary skill in this art to implement Sourour's teaching by assigning M as one resulting in dividing the sum by two to obtain the invention as specified in claims 10 and 32.

Regarding claims 13 and 35, Sourour in view of Nystrom teach all subject matter claimed, as applied to claim 1 or 28. Sourour further discloses wherein each of the plurality of correlation samples comprises an energy measure of a result of the step of correlating a first synchronization channel value to the signal (see Fig.5 and note col.4, lines 10-54).

Regarding claims 14 and 36, Sourour in view of Nystrom teach all subject matter claimed, as applied to claim 1 or 28. Sourour further discloses wherein the circuitry for combining a second set of correlation samples with the first set of correlation samples produces a plurality of combined samples (output of 66 in Fig.6B and note col.5, line 40-41); and further comprising circuitry for determining a peak value in the plurality of combine samples (70 in Fig.6B); and circuitry for determining a time position of the peak value (72 in Fig.6B). (note col.5, lines 30-48)

Regarding claim 16, Sourour in view of Nystrom teach all subject matter claimed, as applied to claim 1. Sourour further teaches wherein the wireless receiver comprises a user station wireless receiver (see 12 in Fig.1).

Regarding claims 17 and 18, Sourour in view of Nystrom teach all subject matter claimed, as applied to claim 1. Sourour further teaches use of implementing the system using a code modulated communication system using direct sequence spread spectrum (note col.1, lines 10-26), however, Sourour does not explicitly teach wherein the wireless communicated signal comprises a CDMA TDD or FDD wireless communicated signal. Nystrom teaches implementing the system using code modulated communication system and further discloses supporting WCDMA, which inherently supports TDD and FDD signals. (note acol.6, lines 43-60)

Therefore, it would have been obvious to one skilled in the art at the time of the invention to support WCDMA in Sourour's system for the purpose of supporting different signaling schemes and thus increase flexibility.

Regarding claims 20,22 and 26, Sourour in view of Nystrom teach all subject matter claimed, as applied to claim 1. Sourour further teaches wherein the threshold comprises a first threshold (n_1), and second set of correlation samples are within a second time sample period (having equal time sample period as the first); wherein each of the correlation samples in the second set has a corresponding sample time relative to the second time sample period; wherein the combining step produces a plurality of combined samples (output of 66) and comprises combining each sample in the second set of correlation samples with a respective sample in the set of correlation samples such that each combine sample has a like sample time relative to the first and second time sample period; and further comprising the steps of: determining a peak value in the plurality of combining samples; and determining a time position of the peak value. (see Fig.6B and note col.4, line 55 – col.5, line 48)

Regarding claim 25, Sourour in view of Nystrom teach all subject matter claimed, as applied to claim 1. Sourour further teaches storing a sample time position (indexes) for each sample in the first set of correlation samples. (note col.5, lines 14-60)

4. Claims 11,12,33 and 34, are rejected under 35 U.S.C. 103(a) as being unpatentable over Sourour et al., USP 6,147,982 (Sourour) in view of Nystrom et al, USP 6,526,091 B1 (Nystrom), cited previously and Ahmed, USP 5,025,457.

Regarding claims 11,12,33 and 34, Sourour in view of Nystrom teach all subject matter claimed, as applied to claim 1 or 28. Sourour, as explained previously, teaches adding and dividing the first and second set. However, Sourour does not explicitly teach wherein the step of combining forms a scaled average or a single pole average (giving more weight to recent samples). Ahmed teaches receiving a signal for synchronization and further teaches (see Fig.14) wherein previous samples and current samples are added (146). The recent samples are given more weight than the previous samples. (note col.13, line 60 – col.14, line 22)

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Sourour's averaging (in Fig.6B) to give more weight to C1 registers, which are the most recent samples for the purpose of performing an exponential filtering, which is easier to implement, as taught by Ahmed. (note col.14, lines 23-33)

5. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sourour et al., USP 6,147,982 (Sourour) in view of Nystrom et al, USP 6,526,091 B1 (Nystrom), cited previously and Raith, USP 5,930,706.

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Regarding claim 19, Sourour in view of Nystrom teach all subject matter claimed, as applied to claim 1. Sourour further teaches wherein the correlation samples are compared with a different threshold when no samples are stored, since threshold level is high. However, Sourour in view of Nystrom do not explicitly teach the steps of measuring a level of noise in the signal, and setting the threshold in response to the level of noise. Raith teaches detection of wireless signal, and further teaches wherein a threshold is adjusted based on signal to noise ratio (SNR). (note col.35, lines 54-55) Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Sourour's teaching by implementation of determining a SNR of the received signal for the purpose of adjusting to the environment wherein the noise may affect synchronization.

Allowable Subject Matter

6. Claims 15,21,23,24,27 and 37 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, and overcome the claim objections.
7. The following is a statement of reasons for the indication of allowable subject matter: Present application discloses synchronization of wireless signal received wherein a correlated signal are stored in a memory element only when the correlated signal is greater than a threshold. Closest prior art,

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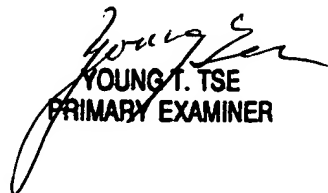
Sourour, teaches all subject matter claimed. However, prior art viewed solely or in combination does not teach or suggest wherein the signal having a secondary synchronization channel component is correlated with a plurality of comma free codes in response to the time position of the peak value. Furthermore, prior art does not teach the combining additional sets of correlation samples with the average sample set, and also does not teach storing additional time positions for any sample correlations in the second time sample period that exceed a second threshold.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Ahn whose telephone number is (571) 272-3044. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (571) 272-2988. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sam K. Ahn
10/29/04


YOUNG T. TSE
PRIMARY EXAMINER